

SECTION 70**SEWAGE HOLDING AND TRANSFER SYSTEM
POLLUTION ABATEMENT**

ITEM	PAGE
70.1 REFERENCES	1
70.2 INTRODUCTION	2
70.3 GENERAL	2
70.4 TANKS.....	2
70.4.1 OILY WATER HOLDING TANKS	2
70.4.2 USED OIL HOLDING TANKS	3
70.4.3 JACKET WATER HOLDING TANKS	4
70.4.4 SEWAGE HOLDING TANKS	4
70.5 CONTAINMENT COAMINGS AND DRIP PANS.....	5
70.6 OILY WATER SEPARATOR SYSTEM	5
70.7 SEWAGE TREATMENT SYSTEM.....	6
70.7.1 SEWAGE AND GRAYWATER LIFT, AND TRANSFER STATIONS.....	6
70.7.2 SEWAGE HOLDING TANKS	7
70.7.2.1 Tank Aeration Blowers and Silencers	7
70.7.2.2 Tank Wash System	7
70.7.2.3 Tank Fume Exhaust	7
70.7.3 SEWAGE TRANSFER PUMPS	8
70.7.4 SEWAGE TRANSFER SYSTEM.....	8
70.8 SPARE PARTS AND INSTRUCTION MANUALS	9
70.9 TESTS, TRIALS AND INSPECTIONS.....	9
70.10 PHASE II TECHNICAL PROPOSAL REQUIREMENTS.....	9
70.11 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS	9

70.1 REFERENCES

(71A) Code of Federal Regulations - 46 CFR Sub-chapter F

70.2 INTRODUCTION

This Section contains the Contractor Design and Provide general requirements applicable to sewage holding and transfer pollution abatement systems and is supplemented by the requirements described in other Sections of the Technical Specification.

For WSF Fleet-wide Standardization purposes, End No. 1 of the Vessel shall always be considered the bow, and this designation shall delineate port and starboard, fore and aft wherever they are addressed in the Technical Specification.

70.3 GENERAL

Storage tanks, systems and equipment shall be provided to collect, store, and discharge wastes in accordance with Authoritative Agency rules and regulations, and environmental laws. Provisions shall be provided to minimize the accidental discharge of wastes.

The sewage holding and transfer system shall accept drains from the sanitary and interior deck drain system, store and aerate the effluent, and pump it to a transfer station ashore for further processing. The pumping system shall be capable of transfer between tanks, and transfer ashore via the transfer stations. The Lower Vehicle Deck transfer stations shall be located on the Starboard Side, End No. 1 and Port Side, End No. 2.

Tanks storing and/or holding oil, oily water, engine jacket water, sewage or other polluting fluids **shall not** share boundaries with the shell plating of the Vessel.

Shore connections and discharges for tanks and systems containing oil, oily water, engine jacket water, sewage or other polluting fluids shall be located within containment coamings with “valved” drains back to the discharge piping system to allow for draining any effluent from the containment back into the system.

See Section 73 of the Technical Specification for general pump requirements. See Section 74 of the Technical Specification for general piping and material requirements and Section 75 of the Technical Specification for insulation and lagging requirements.

70.4 TANKS

70.4.1 Oily Water Holding Tanks

The two (2) Oily Water Holding Tanks (OWHT) shall be provided, one (1) in each Engine Room, for storing and promoting the separation of oil from oil-contaminated

1 water. Each tank shall be an independent structural tank having a capacity of at least
2 1,000 gallons.

3 The Oily Water Holding Tanks shall be filled via the bilge pump and bilge stripping
4 pump. The contents of the OWHTs shall be processed by the oily water separator and/or
5 pumped to a shore connection by the used oil and oily water transfer pump. The system
6 shall be capable of transferring between tanks by the used oil and oily water transfer
7 pump.

8 The Oily Water Holding Tanks shall each be provided with two (2) access manholes on
9 top, and an aeration system from the Ship's Service air system by way of a 1 to 2 psi
10 regulator to aid performance of the oil remediator and with heating coil systems as set
11 forth in Section 60 of the Technical Specification. Refer to Section 78 of the Technical
12 Specification for additional design requirements.

13 **70.4.2 Used Oil Holding Tanks**

14 The two (2) Used Oil Holding Tanks shall be provided, one (1) in each Engine Room, for
15 storing used oil transferred from engine sumps and other machinery and equipment. The
16 tank shall be an independent structural tank and having a capacity of at least 1,000
17 gallons. Each tank shall have at least two (2) manholes on the top as described in this
18 Section, and Sections 4 and 78 of the Technical Specification.

19 The Used Oil Holding Tanks shall have a four (4) inch IPS hard piped connection to the
20 fueling station on the Lower Vehicle Deck for the purpose of pumping out the Used Oil
21 Holding Tanks utilizing a vacuum truck on the Vehicle Deck. The termination in the
22 fueling station shall include an accessible kamlock fitting with cap.

23 The top of each Used Oil Holding Tank shall be at a level below the lowest part of its
24 associated Main Engine oil sump. The intent is to allow gravity draining of each Main
25 Engine lubricating oil sump to its associated Used Oil Holding Tank.

26 The Used Oil Holding Tanks shall be provided with heating coil systems as set forth in
27 Section 60 of the Technical Specification. Refer to Section 78 of the Technical
28 Specification for additional design requirements. Fuel Oil Purifier Sludge Tank

29 A fuel oil purifier sludge tank, with gravity drain, shall be provided as part of the purifier.
30 Discharge from the sludge tank shall be by gravity drain to the Oily Water Holding Tank.

31 Refer to Sections 57, 60, and 78 of the Technical Specification for additional design
32 requirements.

70.4.3 Jacket Water Holding Tanks

A Jacket Water Holding Tank (JWHT) shall be provided in each Engine Room for storing engine jacket water during maintenance and repair activities on the Main Engines and/or Ship's Service Diesel Generator engines. Each tank shall be an independent structural tank having a capacity of at least 500 U.S. gallons, but shall have, as a minimum, the capacity to hold the jacket water from one (1) Main engine and one (1) Ship's Service Diesel Generator at the same time.

Each tank shall be provided with a watertight bolted maintenance access as approved by the WSF Representative.

The JWHTs shall be filled and drained as set forth in Section 59 of the Technical Specification. The jacket water holding tanks shall be pumped via a transfer system back to the diesel engines.

Refer to Sections 59, 60, and 78 of the Technical Specification for additional design requirements.

70.4.4 Sewage Holding Tanks

The two (2) Sewage Holding Tanks shall be of the independent type with full access to the tank's inside and outside surfaces for inspections. The tanks shall be approximately 8,000 gallons capacity each. The tanks shall only have common boundaries with voids and accessible spaces (no tanks on the hull). Tanks shall be fabricated from 15.3# ($\frac{3}{8}$ " thick) steel plate, be externally stiffened, have a sloped bottom to the pump suction, and be coated in accordance with Section 14 of the Technical Specification. Alternatively, tanks fabricated from GRP or other corrosion resistant materials will be considered by WSF. The tanks shall be fitted with tank level indicators, high level alarms, freshwater wash-down/flushing connections with nozzles for washing all tank boundaries, tanks aeration systems, isolation valves on all incoming lines, overflows and powered vents, as described in Sections 11, 59, 71, and 78 of the Technical Specification. Each tank shall have at least two (2) manholes on the top as described in this Section, and Sections 4 and 78 of the Technical Specification.

The tanks shall be configured to store all the plumbing and sanitary drains from throughout the Vessel. The tanks shall also receive effluent from the Oily Water Separator that contains less than 100 parts per million (PPM) oil.

The Sewage Holding Tanks shall have a powered ventilation system, as described in Section 11 of the Technical Specification.

70.5 CONTAINMENT COAMINGS AND DRIP PANS

Built-in continuously welded steel coamings shall be installed integral to the foundation around the base of all pumps, engines and all other equipment which convey any fluid/effluent other than fresh water, or which utilize diesel, lubricating and/or hydraulic oils. Foundation coamings and permanent stainless steel drip pans shall also be provided at other locations where oily fluids may accumulate during operation or maintenance.

Coamings shall be at least $\frac{3}{16}$ inch thick \times $1\frac{1}{2}$ inches high (2 inches for engines), and of plan dimensions suitable for the equipment. Coaming dimensions shall conform to containment capacity requirements of regulations where applicable. Coamings shall be installed at the base of foundations or incorporated into the tops of foundation pedestals as best suits the design for particular equipment items.

Stainless steel drip pans shall be permanently installed beneath such items as strainers, filters and oil burners. Drip pans shall be #11 gauge \times $1\frac{1}{2}$ inches high, and of plan dimensions suitable for the equipment.

Provide a dedicated filter drain box for each Main Engine, piped to the Used Oil Tank, as directed by the WSF Representative.

Except as otherwise specified herein, foundation coamings and drip pans shall be fitted with valved drain lines with sufficient space at the piping terminus for gravity draining contents into a portable container. Coamings and drip pans serving engines and other equipment in the Engine Rooms, where frequent or continuous accumulations of oily fluids can be expected, shall have valveless gravity drainage piping installed with drains to the Used Oil Tank. This drain piping, with check valve, shall be sloped about $\frac{1}{4}$ inch per foot where possible.

70.6 OILY WATER SEPARATOR SYSTEM

For WSF Fleet-wide Standardization purposes, provide a HELI-SEP Model 500 with an OCD-2-DR Oil Content Monitor complete with its own supply pump, electric motor, and controller to utilize a 120 Vac, single-phase power supply. The OCD-2-DR monitors, alarms, and transfers the discharge at 15 and 100 PPM. The separator shall be furnish with the manufacturer's standard motor and controllers. The HELI-SEP 500 shall be installed in Engine Room No. 1.

The oily water separator shall be installed in accordance with the manufacturer's directions. Provide suction from, and a recirculation line to the No. 1 Oily Bilge Water Tank and the

No. 1 Used Oil Tank, a discharge for oil to the No. 2 Used Oil Tank, and a discharge for processed water to a Sewage Holding Tank. The suction lines shall be four (4) inch from the tank bottom and be provided with foot valves and a simplex strainer with $\frac{1}{8} - \frac{3}{16}$ inch diameter perforations. Provide hot and cold water supply to the unit including a stop valve, FEBCO 825/Y, or equal, high hazard backflow preventer, flow regulator, pressure reducing valve, and pressure gage.

The separator shall be provided with a three (3) inch high drip pan under the separator assembly.

Piping materials for the connections required shall be in accordance with Section 74 of the Technical Specification. The piping from the separator to the Used Oil Tank shall be in accordance with the *lubricating oil service* material specification. The lines connecting the separator to the Oil Bilge Water Tank shall be in accordance with the *bilge system* material specification. The water supply shall be in accordance with the *hot and cold supply water system* material specification. Provide discharge piping to a Sewage Holding Tank, piping materials shall be in accordance with the *interior drains* material specification.

See Sections 11 and 59 of the Technical Specification.

70.7 SEWAGE TREATMENT SYSTEM

70.7.1 Sewage and Graywater Lift, and Transfer Stations

Sewage lift and transfer stations shall be provided to collect the drains from the plumbing fixtures, soil drains, interior deck drains, etc., described in Sections 11, 20, and 59 of the Technical Specification, not capable of direct gravity drainage to the Sewage Holding Tanks. Graywater lift and transfer stations shall be provided where no water closets feed into the holding tank. A centrifugal pump shall transfer graywater to the sewage tanks automatically via level switches. Each Sewage lift station shall transfer accumulated sewage to the Sewage Holding Tanks automatically via level switches and non-clogging type sewage transfer pump(s). Vents from the lift stations shall terminate twelve (12) inches below the deck above in the overhead of the space where they are located, and arranged so as to avoid contaminating the space, and the intake of ventilation systems with noxious fumes. Lift stations shall be fitted with provisions for the installation of Owner Furnished Equipment (OFE) high level alarms.

Each lift station shall be sized to meet the requirements of the Engineering Spaces services and consist of a properly sized LITTLE GIANT Pump Co., Eliminator[®], 9E Series, or equal, submersible non-clog sewage dewatering/effluent pump, with float

1 switch, and sewage/graywater holding tank with cover. The intent is that all lift stations
2 shall be identical.

3 **70.7.2 Sewage Holding Tanks**

4 The two (2) Sewage Holding Tanks shall be as set forth in the *TANKS* Subsection above.

5 **70.7.2.1 Tank Aeration Blowers and Silencers**

6 For each Sewage Holding Tank, provide one (1) aeration blower capable of 128
7 CFM each, at a head pressure at least 0.5 PSI higher than maximum head pressure
8 at the bottom of the holding tank. The aeration blowers shall be SPENCE LOBE-
9 AIRE Model RB41, or equal, with a direct drive 7.5 HP motor mounted on a
10 channel steel base plate. The aeration system (both aeration pumps) shall be
11 designed so that should one (1) blower fail, the second blower shall allow for
12 aerate of both tanks simultaneously with the one (1) remaining aerator pump.

13 For each aeration blower, provide a UNIVERSAL RIS-4 inlet silencer, or equal,
14 with CCF-4 inlet filter, or equal, a vacuum relief valve on the line between filter
15 and blower inlet, a discharge relief valve, an RD-4 discharge silencer, and a check
16 valve.

17 The aeration blowers shall be located generally to suit the Contractor's approved
18 design, but, aeration blowers must be located at a level above the top of the
19 holding tanks, in a location approved by the WSF Representative, and each
20 blower shall be provided with a check valve on the discharge side of the aeration
21 blower to prevent any effluent backflow.

22 **70.7.2.2 Tank Wash System**

23 Provide a tank washing system in each tank as set forth in Section 59 of the
24 Technical Specification.

25 **70.7.2.3 Tank Fume Exhaust**

26 The fume exhaust pipe and fan are provided in Section 11 of the Technical
27 Specification.

28 Fumes are exhausted from each sewage holding tank through a dedicated six (6)
29 inch, Schedule 40 galvanized pipe, with a valved cross-connect upstream of the
30 centrifugal exhaust fan and its associated inlet valve, discharging out the funnel to
31 suit the Contractor's approved design.

70.7.3 Sewage Transfer Pumps

Provide two (2) CARVER, or equal, non-clogging type centrifugal sewage transfer pumps along with all associated foundations, piping and electrical connections to produce a complete and operable system.

Provide mechanical seal with no external sealing water, complete with isolation valves and check valves, to each pump.

Under each sewage transfer pump, provide a drip pan, sloped to a drain in one corner. The drip pan shall be of sufficient volume to contain all effluent in the pump and piping between the pump's isolation valves. The drip pan shall be fabricated from Type 316L stainless steel. Provide a one (1) inch "valved" drain pipe and a five (5) gallon plastic pail mounted under the pump base to drain effluent from the drip pan.

See Section 73 of the Technical Specification for additional pump requirements.

70.7.4 Sewage Transfer System

A sewage transfer system shall be provided to discharge the contents of the sewage holding tanks to shore connections at each End of the Vessel. Shore connections shall consist of a four (4) inch kamlock quick disconnect hose connection with end cap, connected by a four (4) inch pipe to a six (6) inch to four (4) inch eccentric reducer. The eccentric reducer shall be connected by six (6) inch pipe to a six (6) inch full port ball valve. Provisions shall be made for drain back and transfer hose flushing.

The Two (2) sewage transfer pumps shall sized to empty the two (2) sewage holding tanks in 16 minutes. The pumps shall be manually started with shutdown controlled by level switches in the Sewage Holding Tanks. The pumps shall be arranged to allow one (1) of the two (2) pumps to stop automatically at the 5-percent (5%) level while the other pump is allowed to pump the tanks dry.

Provide a readily accessible cleanout port at each pump suction for clearing of debris.

A Type 316L stainless steel spill containment shall be provided at each sewage hose connection on the Vehicle Deck to catch any spills that may occur when connecting/disconnecting the shore side sewage hose. The containment shall be piped so that any spillage is drained back into the Vessel sewage holding tanks (see Section 74 of the Technical Specification).

- 1 Provide a sewage discharge pressure/vacuum gage, and a clean and backflush pressure
2 gage at the discharge station at each End of the Vessel. See Section 85 of the Technical
3 Specification for gauging requirements.

4 **70.8 SPARE PARTS AND INSTRUCTION MANUALS**

- 5 Provide a list of recommended spare parts and special tools for those items which are
6 Contractor furnished, together with parts lists and instruction manuals necessary to maintain
7 and service provided equipment and accessories in accordance with the requirements of
8 Sections 86 and 100 of the Technical Specification.

9 **70.9 TESTS, TRIALS AND INSPECTIONS**

- 10 Tests and/or trials shall be provided in accordance with this Section and Section 101 of the
11 Technical Specification.

- 12 Inspections shall be performed as defined in this Section and Section 1 of the Technical
13 Specification.

14 **70.10 PHASE II TECHNICAL PROPOSAL REQUIREMENTS**

- 15 The following deliverable, in addition to others required by Section 100 of the Technical
16 Specification and the Authoritative Agencies, shall be provided during the Phase II Technical
17 Proposal stage of Work in accordance with the requirements of Section 100 of the Technical
18 Specification:

- 19 A. Piping System Calculations - Sewage Holding and Transfer System

- 20 See Section 100 of the Technical Specification for additional requirements regarding
21 technical documentation.

22 **70.11 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS**

- 23 The following deliverable, in addition to others required by Section 100 of the Technical
24 Specification and the Authoritative Agencies, shall be provided during the Phase III Detail
25 Design stage of Work in accordance with the requirements of Section 100 of the Technical
26 Specification:

- 27 A. Piping System Calculations - Sewage Holding and Transfer System

- 1 See Section 100 of the Technical Specification for additional requirements regarding
- 2 technical documentation.

(END OF SECTION)